

C-A OPERATIONS PROCEDURES MANUAL

8.10.1 AGS Experimental Beam Line Proton Operating Procedure

Text pages 1 through 4

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Revision No. 00

Approved: _____
AGS Department Chairman Date

8.10.1 **EXPERIMENTAL BEAM LINE PROTON OPERATING PROCEDURES**

1. Purpose

To provide guidelines to AGS experimenters for the safe and efficient operation of the experimental beam lines at the AGS.

2. Responsibilities

The spokespersons for each experiment or their designated deputy.

3. Prerequisites

- 3.1 A thorough review of the experiment must be conducted by the Radiation Safety Committee, and the Experimental Safety Committee.
- 3.2 Radiation detectors and interlocks must be in place in each beam line to prevent excursions in the radiation levels in areas beyond pre-determined levels. Barriers delineate where personnel are allowed to be.
- 3.3 Experiments may not operate until a thorough check-out by the Experimental Area Group (EAG) operations group and the Security Group.
- 3.4 The scientific experimenters will not be permitted to operate a beam line until all of the items on the beam line check-off sheet (held in the AGS Main Control Room) are satisfactorily completed by the Liaison Engineer and Physicist for the beam line, the Security Group, the Operations Coordinator, the EAG Watch and Health Physics.
- 3.5 In advance of the beam line startup, the experimenter must inform the Liaison Engineer of the sign and momentum of the beam particles to be used in the experimental run.
- 3.6 Qualified and trained AGS experimenters.

4. Precautions

None.

5. Procedures

- 5.1 Control of the components in the beam line is done through the DIBBUK computer control system [DIBBUK USERS GUIDE by D.I. Lowenstein, EP&S Division Technical Note No. 75 (1977)] which restricts the operation of the components within safe limits. Detailed instructions for tuning the beam are supplied by the Liaison Physicist assigned to each beam line. These instructions are to be found in the Safety/Operations Manual which is maintained for each beam line.
- 5.2 Emergency situations should be immediately reported to the Main Control Room. The experimenters should familiarize themselves with the emergency evacuation procedures, particularly emergency evacuation klaxon and the fire alarm bells.
- 5.3 Non-emergency trouble with beam line components should be reported to the EAO Watch which is on duty whenever the AGS is operating.
- 5.4 All experimental equipment must be operated in a safe manner consistent with the rules established by the Experimental Safety Committee for a particular experiment. These rules are specified in a letter written to the experimental spokesman from the Committee to be found in the Safety/Operations Manual for each beam line.
- 5.5 The experimenters must inform the EAG Watch before introducing flammable gases on to the floor.
- 5.6 Devices containing liquid hydrogen are to be operated only by the Cryogenic Watch and must not be touched by the experimenters.
- 5.7 Particular attention must be paid to special electromagnets such as large gap spectrometers. There is considerable hazard from the large fringe field of such magnets, and so the area surrounding the magnet must be checked to be sure that it is free of ferromagnetic materials and personnel before turning them on.

6. Radiation Safety for Beam Lines

Radiation safety guide lines for the AGS beam lines are set by the AGS Radiation Safety Committee. The radiation safety systems for each beam line consist of one or more of the following items.

- 6.1 Barriers or fences which prevent individuals from entering high or potentially high radiation areas. Under no circumstances can these barriers be passed without permission of Health Physics personnel.
- 6.2 Radiation detectors installed by the Security Group which shutdown the beam line or the AGS if the radiation levels in the beam or surrounding area exceeds predetermined limits may not be moved or altered in any manner by the experimenters.
- 6.3 Current comparators which limit the maximum momentum of the beam line to a value safely below the primary beam momentum may not be changed or bypassed by the experimenters.
- 6.4 Collimators which serve as beam limiters may not be moved or altered in any manner by the experimenters.
- 6.5 If the radiation safety devices are not functioning properly, the Health Physics Technician should be informed through Main Control.

7. References

"CHARACTERISTICS OF INDIVIDUAL BEAM LINES" - More detail may be found in the AGS Beam Book. Brookhaven National Laboratory 50874, May 1978, or in the Safety/Operations Manual for each beam line. Some parameters are given here:

A1 High Energy Unseparated Beam
Momentum Range 5-21 GeV/c
Maximum Intensity for 10^{-} incident
Negative - 2×10^d @ 8 GeV/c
Positive - limited to $\{2 \times 10^d\}$ by radiation monitors
Heavy Ions - limited to $\{10^b\}$ by radiation monitors

A2 Test Beam
Momentum Range 0.5-10 GeV/c
Maximum Intensity for 10^{-} incident
Negative - 10^c @ 2 GeV/c
Positive - $\{2 \times 10^c\}$

A3 Neutral Beam
Momentum Range Continuous Spectrum 1 to 15 GeV/c
Intensity for 10^{-} incident
 $\{5 \times 10^e\}$ neutron, KOL

B1 Heavy Ion Beam
Momentum Range 5-21 GeV/c
Maximum Intensity for 10^{-} incident
Heavy Ions - limited to $\{10^b\}$ by radiation monitors
Negative - limited to $\{2 \times 10^d\}$ @ 8 GeV/c
Positive - limited to $\{2 \times 10^d\}$ by radiation monitors
Heavy Ions - limited to $\{10^b\}$ by radiation monitors

B2 or B4 Medium Energy Separated Beam
Momentum Range 1-9 GeV/c
Maximum Intensity for 10^{-} incident
Negative - $\{2 \times 10^d\}$ @ 8 GeV/c
Positive - limited to $\{2 \times 10^d\}$ by radiation monitors

B5 Neutral Beam

Momentum Range Continuous Spectrum 1 to 15 GeV/c

Intensity for 10^{-} incident
 $\{5 \times 10^e\}$ neutrons, KOL

C1 High Energy Unseparated Beam
Momentum Range 5-21 GeV/c
Maximum Intensity for 10^{-} incident
Negative - $\{2 \times 10^d\}$ @ 8 GeV/c
Positive - limited to $\{2 \times 10^d\}$ by radiation monitors
Polarized Protons - limited to $\{5 \times 10^e\}$ by radiation monitors

C2 or C4 Low Energy Separated Beam

C5 Heavy Ion Beam
D1 Primary Proton Beam
D6 2 GeV/c Separated Beam
U1 Neutrino Beam
VI Beam for g-2

8. Attachments

None.